REMARKS/ARGUMENTS

Reconsideration is requested in view of the foregoing claim revisions and following remarks. Claim 26 has been editorially revised. Support for the revision to claim 26 is found in paragraphs [0003] and [0019] as well as Figure 2, among other places. Claim 33 has been canceled. Claims 26-31 remain under consideration in the present application.

Claim Rejections – 35 USC §103

Claims 26-33 are rejected under 35 U.S.C. §103(a) as now unpatentable over either of Iversen (US 3,936,645) or Corbeil et al. (US 2004/0262526) in view of either Mir et al. (US 5,064,684) or Borrelli et al. (US 6,796,148). Applicant respectfully traverses this rejection.

Claim 26 is directed to an anisotropic scintillator for use in an imaging system comprising:

a scintillator element comprised of a scintillator material having a first optical property;

a three-dimensional pattern formed in said scintillator element utilizing a pulse laser, said pulse laser altering said first optical property at a plurality of discrete locations in said scintillator element such that said three dimensional pattern is comprised of a second optical property and such that said three dimensional pattern forms localized channel regions in said scintillator element.

wherein said three-dimensional pattern is configured to control the spread of photons to achieve desired signal sharing among the plurality of regions having borders defined by the plurality of discrete locations within said scintillator element.

None of the cited art alone or in combination teaches or suggests a three-dimensional pattern configured to control the spread of photons to achieve desired signal sharing among a plurality of regions having borders defined by a plurality of discrete

locations within a scintillator element as recited in claim 26. Even if the cited references are combined, they would not result in a three-dimensional pattern configured to control the spread of photons to achieve desired signal sharing among a plurality of regions having borders defined by a plurality of discrete locations within a scintillator element as recited in claim 26.

The cited art can only be combined in a manner to teach or disclose Applicant's claimed invention by improperly using the Applicant's specification as a template, since the cited art is otherwise completely silent regarding a three-dimensional pattern configured to control the spread of photons to achieve desired signal sharing among a plurality of regions having borders defined by a plurality of discrete locations within a scintillator element as recited in claim 26.

The invention of claim 26 controls light spreading within a scintillator element. Block detectors, e.g. PET, require that light is shared between elements and that the degree of this light sharing is carefully controlled so that the position of interaction of the gamma ray in the scintillator block can be determined by the measurement of the centroid of the detected optical photons that impinge on discrete detector elements.

Paragraph [0003] states "in applications that rely on centroid detection to determine the position of interaction, precise control of the optical anisotropy is needed to preserve the spatial information. In addition, precise control is needed to allow enough spreading of the signal such that it is shared amongst discrete detector elements in such a way as to allow reliable centroid determination. Thus, an improved method of controlling the spreading of optical photons within a scintillator would be highly desirable."

Paragraph [0004] states "it would therefore be highly desirable to have a method of manufacturing an anisotropic scintillator that provided precise control of the optical photon spreading within the resultant scintillator."

The invention of Iverson however is directed to structures designed so that substantially all of the visible light generated above a given photo diode detector element is directed toward that element, and that much of the off-axis visible light radiation generated in the structure is directed toward the detector element. Further, cross-talk between different elements is minimized, and oblique or off-axis ionizing radiation is attenuated to prevent generation of visible light over two or more detecting elements.

The invention of Iverson therefore does not provide for precise control of light spreading to achieve desired signal sharing among a plurality of discrete locations within said scintillator element as required by claim 26.

Corbeil refers only to forming micro-voids and ablating material.

The rejection states "each of Mir et al. and Borrelli et al. disclose making waveguides in ceramic or glass material by using a laser to selectively densify certain discrete portions so irradiated so that the laser treated portions become crystalline in an otherwise non-crystalline material. Since the basic function of the scintillator elements in the primary references is that of a waveguide, i.e., to guide X-rays and gamma rays, it is submitted that one of ordinary skill in the art would have knowledge of the methods used in secondary references to selectively pattern the scintillator elements. The secondary references are directed to making waveguides."

The basic function of the scintillator elements in the primary references however is not as asserted in the rejection, that of a waveguide for x-rays and gamma rays. Instead, it is optical photons, not x-ray or gamma rays that are guided in all of the primary references.

Further, waveguides generally refer to structures whose cross-section dimensions are on the order of the wavelength of the light being guided, i.e. a few microns to a

hundred microns. Waveguides rely on the wave-like nature of light. PET detectors have cross-section dimensions on the order of several millimeters. The scintillators to not act as waveguides. On this dimensional scale, only ray-like behavior of light is important. The photons are reflected, refracted, or scattered and do not explicitly rely on the wave-like nature of photons.

The claimed invention relies on sharing of light between regions within a scintillator element, and relies on precisely controlling this sharing of light between the regions. The claimed invention is therefore distinctly different from the inventions of Mir et al. and Borrelli et al., whether taken alone or in combination with the primary references.

Further, the bulk of the volume of the waveguides disclosed by Mir et al. and Borrelli et al. consists of the laser-modified region. The laser modified region of the claimed invention forms only the border regions at the discrete locations as depicted for one embodiment in Figures 2 and 4 and as recited in claim 26. The claimed invention requires a three-dimensional pattern formed in said scintillator element utilizing a pulse laser, said pulse laser altering said first optical property at a plurality of discrete locations in said scintillator element such that said three dimensional pattern is comprised of a second optical property and such that said three dimensional pattern forms localized channel border regions in said scintillator element.

For at least these reasons, claim 26 is patentable over the cited art alone, or in combination. Claims 27-31 are patentable through their dependency on claim 26. Applicant does not concede the correctness of the rejections or the relevance of the cited art to the remaining claim features.

Since claim 32 does not exist, and claim 33 has been canceled; the rejection is moot as to claims 32 and 33.

Favorable reconsideration in the form of a Notice of Allowance is requested. If the Examiner believes a telephone conference would advance the prosecution of this application, the Examiner is invited to telephone the undersigned at (507) 351-4450.

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PATENT TRADEMARK OFFICE

Respectfully submitted,

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